

Adventure Travel and Carbon Offsets

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The vast majority of greenhouse gas emissions come from industry, energy production, and large-scale food production, yet international tourism may be responsible for up to eight percent of annual emissions of carbon dioxide, methane, and other greenhouse gasses.¹ Adventure travelers who make environmentally conscious choices when selecting their destinations and activities could also make environmentally conscious choices, like offsetting their carbon footprint, directly related to their travel, thus compensating for their personal contribution to total greenhouse gas emissions and global climate change.

Responsible travelers should minimize their personal contribution to climate change.

The most impactful way to take action on climate change is to make choices that reduce fossil fuel consumption and therefore reduce greenhouse gas emissions. Unfortunately, directly reducing emissions is not necessarily an easy task for travelers, because they may not have the option to choose low-emissions alternatives. Most travelers' emissions are attributable to air and ground transportation as well as hotel and restaurant operations. Although international aircraft of today have a significantly smaller carbon footprint compared to those of yesteryear,² international aircraft unavoidably burn jet fuel and emit carbon dioxide in their exhaust, so it remains difficult or impossible to completely eliminate emissions from travel. Additionally, while in some places it might be possible for an individual traveler to seek out an eco-lodge that uses renewable fuel or to book travel through a specialty operator who will create a low-emissions itinerary, generally individual travelers lack the opportunity to choose the energy source for their transportation, lodging, and food preparation.

Despite these challenges, there is still something that travelers can do to mitigate the carbon footprint of unavoidable emissions related to international travel. We advise individuals to purchase carbon offsets that support the reduction of greenhouse gasses already in the atmosphere and promote technologies that stop carbon pollution at its source. Offsets do not end the carbon emissions of a particular flight or jeep ride, but they are intended to mitigate the harmful effects of carbon pollution.

In some cases, purchasing carbon offsets is easier said than done. The carbon offset market is not oriented toward individual consumers, so purchasing carbon offsets can be a complicated undertaking. This paper provides background information to inform travelers about offsetting the carbon footprint of their travel. Our goal is to

¹ Manfred Lenzen, et al., *The Carbon Footprint of Global Tourism*, 8 NATURE CLIMATE CHANGE, 522 (2018).

² Between 1968 and 2014 the average fuel consumption of new aircraft fell 45%. Anastasia Kharina and Daniel Rutherford, *Fuel Efficiency Trends for New Commercial Jet Aircraft: 1960 to 2014*, International Council on Clean Transportation (2015).

make carbon offsetting as easy as possible for travelers in the hopes that more individuals will participate in this earth-friendly practice.

I. What is a carbon offset?

A *carbon offset* represents the voluntary elimination of a specific amount of greenhouse gas that would otherwise be emitted into the atmosphere. Scientists have standardized measurements of greenhouse gases so that emissions are always stated in terms of equivalence to emission of carbon dioxide, so *carbon* in “carbon offset” refers to the reduction of *carbon dioxide equivalent* (CO₂e), but a specific offset project might eliminate carbon dioxide, methane, or nitrous oxide emissions.

Certified carbon offsets are best

Not all carbon offsets are created equally. There are notorious cases of offset scams – where the perpetrators collected payment, provided false offset certificates, and then absconded with the proceeds.³ Other offset projects have attracted critics who argued that the projects would have moved forward even without the sale of carbon offsets, so it was impossible to say that purchasing carbon offsets had a real effect on the climate.⁴ In the United States, the Federal Trade Commission regulates the marketplace, including deceptive sale of carbon offsets, but it remains largely incumbent on purchasers to determine whether a particular seller of carbon offsets is reliable, or a claimed carbon reduction is valid.⁵

Travelers should purchase carbon offsets from projects certified by a third-party evaluator using a reliable verification standard. There are several verification standards from which to choose but all carbon verification standards share the same basic principles meant to ensure that a real reduction in carbon emissions actually happens.

Verified: Projects must reduce carbon emissions in a way that can be *quantified* and *monitored* by an independent evaluator using accepted methodologies.

Permanent: A carbon project must result in a *permanent* reduction of carbon and not a reduction that could be reversed in the future.

³Doug Struck, *Carbon Offsets: How a Vatican Forest Failed to Reduce Global Warming*, CHRISTIAN SCIENCE MONITOR (2010), <https://www.csmonitor.com/Environment/2010/0420/Carbon-offsets-How-a-Vatican-forest-failed-to-reduce-global-warming>.

⁴ Lisa Song, *Why Carbon Credits for Forest Preservation May be Worse Than Nothing*, PROPUBLICA (2019), <https://features.propublica.org/brazil-carbon-offsets/inconvenient-truth-carbon-credits-dont-work-deforestation-redd-acre-cambodia>.

⁵ See Guides for the Use of Environmental Marketing Claims, 16 C.F.R. § 260.5 (2012). Additionally, some carbon marketplaces voluntarily impose rules for carbon brokers that mirror regulations placed on financial market brokers.

Additional: The carbon reduction must *supplement* what would have happened in a hypothetical world without the carbon project. In other words, the carbon reduction must have occurred only because of the project.

Leakage: Carbon projects must show that the observed reduction is real and *not a result of shifting* emissions elsewhere.

Three types of carbon offset projects

There are three broad categories of carbon offset projects, each with its own potential co-benefits and conflicts.

1. Removing Carbon Dioxide

Trees and plants extract carbon dioxide from the air as part of the process of photosynthesis. Planting new trees or preventing the loss of existing forests can reduce existing carbon dioxide in the atmosphere and as added co-benefits, provide natural habitats for wildlife and encourage biodiversity.

2. Improving Energy Efficiency

Energy efficiency projects utilize new technologies to reduce the energy use of existing processes. By lowering the demand for energy, these projects reduce fossil fuel emissions. Co-benefits may include reduced air pollution and lower energy costs for the end-user.

3. Promoting Renewable Energy

While the costs are coming down, it still is 25 to 40 percent more expensive to develop a new solar or wind generation facility than to build a natural gas plant of the same generation capacity.⁶ Carbon offsets can subsidize the capital costs to build new renewable energy plants, reduce the costs for end-users, and remove a financial barrier to bringing carbon-free electricity generation onto the grid.

II. The carbon footprint of international adventure travel.

In order to purchase the appropriate amount of carbon offsets, a traveler must first determine their carbon emissions footprint. While there is value for scientists and policy makers to understand the exact carbon cost of various activities, our focus is to enable individual travelers to easily offset the carbon emissions of particular trips. To that end, we think that it is reasonable to purchase carbon offsets based on an estimate of a traveler's footprint rather than a precise calculation, so long as the

⁶ Lazard's *Levelized Cost of Energy Analysis: Version 12.0*, 15 (2018).

estimate can be reasonably precise and errs toward overestimation rather than underestimation of emissions.

Estimating the carbon footprint of international adventure travel.

We use the International Civil Aviation Organization's online carbon emissions calculator to estimate the carbon footprint of air travel.⁷ For ground transportation, the U.S. Environmental Protection Agency determined that the average minivan produced between 2012 and 2017 emitted between 399 and 418 grams of CO₂ per mile, when the vehicle was new.⁸ We suggest taking the high end of the range and multiplying by the actual distance traveled or a per diem estimate.

The Cornell Hotel Sustainability Benchmarking study has collected a dataset that includes the carbon footprint of hundreds of hotels, lodges, and other forms of accommodation.⁹ While the dataset is not comprehensive, it is still possible to estimate the carbon footprint per night for an average hotel room in many destinations. For destinations not included in the dataset, it is possible to extrapolate an estimated carbon footprint based on lodging located in a similar ecoregion.

The majority of the carbon footprint attributable to diet comes from food production, so, in general, the more processed the food item, the larger the carbon footprint. That means that the carbon footprint of a particular diet is based on the kinds of foods consumed, the amount of processing, energy required for transportation to market, and the impact of agricultural practices on the local environment. Additionally, for travelers, the carbon footprint of diet during travel should take into account the difference in the traveler's diet at home and while traveling, because, of course, if the traveler were home then they would still eat. With these difficult-to-resolve caveats, we assume that while traveling a traveler adopts a 5.9 kg/ CO₂e per day diet-related carbon footprint, which, based on data collected by the United Nations, is the typical diet with the world's largest carbon footprint.¹⁰

To illustrate our methodology, we examined several itineraries to different adventure travel destinations sold by Journeys International and found that a seven-day trip, based on double occupancy, tended to produce between 4 and 6 metric tonnes of CO₂e per traveler for international air travel, local transportation, lodging and food.

⁷ Available at <https://www.icao.int/environmental-protection/CarbonOffset>.

⁸ The 2018 Automotive Trends Report, U.S. Environmental Protection Agency, (2019), <https://www.epa.gov/automotive-trends/highlights-automotive-trends-report>.

⁹ Eric Ricourte, *Benchmarking Index 2018: Carbon, Energy, and Water*, Cornell University School of Hotel Administration, Center for Hospitality Research (2018), <https://scholarship.sha.cornell.edu/chrpubs/257>.

¹⁰ Food Carbon Footprint Index 2018, <https://www.nu3.de/c/food-carbon-footprint-index-2018>.

Four ways to offset adventure travel.

1. Reduce emissions. About 25% of aircraft emissions occur during the take-off and landing portion of flight,¹¹ so choosing a nonstop flight will usually result in lower emissions than covering the same distance using two connecting flights. Also, travelers can opt for newer planes that take advantage of the latest technological advances in fuel efficiency.
2. Purchase offsets at the point of sale. A small but growing portion of travel industry operators offer options to purchase offsets at the same time that travelers purchase airline tickets, lodging, or other travel products. This is an easy way to purchase an offset since the process is integrated into the same transaction and the company might have already done the heavy lifting on determining the carbon footprint. For example, Journeys International can add carbon offsets to your invoice in partnership with the Earth Preservation Fund.
3. Donate to a nonprofit organization. The Earth Preservation Fund only purchases reliably verified carbon offsets that are aligned with the Earth Preservation Fund's mission of supporting community-initiated environmental, educational, and cultural preservation projects. As an added benefit, U.S. donors can receive a tax deduction.
4. Find a carbon retailer. Individuals cannot access the carbon marketplaces where large quantities of carbon offsets are bought and sold, but some brokers sell small quantities of carbon offsets directly to individuals.

Conclusion

International tourism contributes to greenhouse gas emissions and global climate change. However, by purchasing certified carbon offsets, conscientious travelers can reduce their personal contribution to climate change.

¹¹ Ugur Kesgin, *Aircraft emissions at Turkish airports*, 31 ENERGY 372 (2006).